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EXAMINER
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SHAPIRO, LEONID

ART UNIT	PAPER NUMBER
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2629

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Please find below and/or attached an Office communication concerning this application or proceeding.



***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-3, 8-12, 14, 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagata et al. (Pub. No.: US 2001/0028336 A1) in view of Miyazaki (US Patent No. 6, 344, 984 B1).

As to claim 1, Yamagata et al. teaches an image display apparatus comprising a display unit for displaying an image (See Fig. 1, item PNL, page 4, paragraph 0059) and a drive unit for driving this display unit See Fig. 1, items 30, page 4, paragraph 0059), the drive unit being connected by a plurality of signal lines (See Figs. 1, 2, item 4, paragraph 0064), display unit comprises a plurality of display pixels arranged in a matrix form (See Fig. 1, item PNL, paragraph 0004); drive unit comprises a ladder resistor (See Fig. 2, item 6); gray level voltage selecting means selectively connecting gray level voltage wires to plurality of signal lines (See Fig. 2, item 3, NLN, See page 4, paragraphs 0063-0064), wherein the number of analog gradation voltages matched with number of gray voltage wires (in reference – 64) gray level voltage wires (See page 4, paragraph 0063), and matches a number of a plurality of gray level voltage selectors of gray level voltage selecting means connected to the gray level voltage wires (See Fig. 2, item 3, NLN, See page 4, paragraphs 0063-0064).

Yamagata et al. does not show impedance converters each having an input connected to an output of the ladder resistor and gray level voltage wires constituting output lines connected to the impedance converters.

Miyazaki teaches impedance converters connected to an output of a ladder resistor (see Fig. 3, items R1-R5) and gray level voltage wires constituting output lines connected to the impedance converters (See Fig. 3, items A1-A5, V1-V5, from Col. 3, Line 58 to Col. 4, Line 2).

It would have been obvious to one of ordinary skill in the art at the time of invention use impedance converters connected to an output of the ladder and gray level voltage wires constituting output lines connected to the impedance converters as shown by Miyazaki in Yamagata et al. apparatus to reduce the power consumption (See Col. 2, Lines 35-39 in Miyazaki reference).

As to claim 20, Yamagata et al. teaches an image display terminal system, display unit comprising: a plurality of display pixels arranged in a matrix form to display an image (See Fig. 1, item PNL, paragraphs 0004, 0059); a group of signal lines provided for each column to transmit analog image signal and connected to the display pixels (See Figs. 1, 2, item 4, paragraph 0064), a drive circuit for driving pixels and the group of signal lines at prescribed timings (See Fig. 1, items 30, page 4, paragraph 0059), means for causing the display pixels to display an image in a prescribed sequence on the basis of inputted image display data (See Fig. 21, SEL1-SEL4, page 1, paragraph 0008), wherein: circuit has a ladder resistor and a plurality of gray voltage wires connected to an output of the ladder resistor (See Fig. 2, items 6, NLN); group of

signal lines are connected to the gray level voltage wires via a gray level voltage selector (See Figs. 1, 2, items 3, NLN, See page 4, paragraphs 0063-0064), the number of analog gradation voltages being matched with number of gray voltage wires (in He et al. reference – 64) gray level voltage wires (See page 4, paragraph 0063), and a gray level voltage selector connected to the gray level voltage wires (See Fig. 2, item 3, NLN, See page 4, paragraphs 0063-0064).

Yamagata et al. does not show impedance converters each having an input connected to an output of the ladder resistor and gray level voltage wires constituting output lines connected to the impedance converters.

Miyazaki teaches impedance converters connected to an output of a ladder resistor (see Fig. 3, items R1-R5) and gray level voltage wires constituting output lines connected to the impedance converters (See Fig. 3, items A1-A5, V1-V5, from Col. 3, Line 58 to Col. 4, Line 2).

It would have been obvious to one of ordinary skill in the art at the time of invention use impedance converters connected to an output of the ladder and gray level voltage wires constituting output lines connected to the impedance converters as shown by Miyazaki in Yamagata et al. apparatus to reduce the power consumption (See Col. 2, Lines 35-39 in Miyazaki reference).

Miyazaki and Yamagata et al. do not show the gray level voltage selector and the gray level voltage wires are provided over a single substrate. It is a common trend to integrate electronic display and controlling circuits on the substrate of the display in order to reduce costs and to improve the driving speed of display. Therefore, the skilled

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person would also place voltage selector and the gray level voltage wires on the substrate of the display as mention in claim 20, without the exercise of inventive skill.

As to claims 2-3, Yamagata et al. teaches gray level voltage selector (See Fig. 2, item 3) connected to plurality of signal lines (See Figs. 1, items 30, PNL, See page 4, paragraphs 0063-0064).

As to claim 8, Miyazaki teaches liquid crystal display device (See Col. 1, Lines 6-10).

Miyazaki does not show liquid crystal in region between the pixel electrode and the counter electrode.

It would have been obvious if not inherent to one of ordinary skill in the art at the time of invention to use LC material in Miyazaki and Yamagata et al. in region between the pixel electrode and the counter electrode.

As to claim 9, Yamagata et al. teaches a gray level voltage selector is configured by an analog switch using a field effect transistor (See Fig. 2, item Tr, in description See page 4, paragraph 0063).

Miyazaki and Yamagata et al. do not disclose ladder resistor, voltage selector and impedance converters are configured by a polycrystalline Si and on the same substrate. It is a common trend to integrate electronic display and controlling circuits on the substrate of the display in order to reduce costs and to improve the driving speed of display. Therefore, the skilled person would also configured ladder resistor, voltage selector and impedance converters by a polycrystalline Si and on the same substrate of the display as mention in claims 10-12, without the exercise of inventive skill.

As to claim 14, Yamagata et al. teaches ladder resistor is a pair of resistors group, one each for positive voltage gray level generation and inverted polarity gray level generation (See Fig. 2, item 6, in description See page 4, paragraph 0063).

As to claims 21-22, Miyazaki teaches impedance converters are buffer amplifiers (voltage followers)(See Fig. 3, items A2-A5, Col. 3, Lines 58-65).

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki and Yamagata et al. in view of Nakajima et al. (US Patent No. 6, 181, 314 B1).

Miyazaki and Yamagata et al. do not show offset canceling unit for detecting and eliminating any offset voltage between input and output.

Nakajima et al. teaches offset canceling unit for detecting and eliminating any offset voltage between input and output (See Fig. 3, items 23-27, in description See from Col. 3, Line 44 to Col. 4, Line 58).

It would have been obvious to one of ordinary skill in the art at the time of invention use a offset canceling unit as shown by Nakajima et al. in Miyazaki and Yamagata et al. apparatus in order to provide an improved circuit in LCD device (See Col. 1, Line 66-67 in Nakajima et al. reference).

3. Claims 4-5, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki and Yamagata et al. in view of Morita (US Patent No. 6,366,065 B1).

As to claims 4-5, Yamagata et al. and Miyazaki do not show impedance converters configured by differential amplifying circuit using field-effect transistors.

Morita teaches impedance converters configured by differential amplifying circuit using field-effect transistors (See Fig. 10, 12, items 72, QP, in description See Col. 10, Lines 1-9).

It would have been obvious to one of ordinary skill in the art at the time of invention use a differential amplifying circuit using field-effect transistors as shown by Morita in Miyazaki and Yamagata et al. apparatus as part of D-A converter instead of the output buffers.

As to claim 7, Miyazaki and Yamagata et al. do not show means for suspending the functioning of the impedance converters and circuits for short-circuiting the input and output terminals of the impedance converters.

Morita teaches means for suspending the functioning of the impedance converters and circuits for short-circuiting the input and output terminals of the impedance converters (See Fig. 5, items 72, Q2, in description See Col. 6, Lines 39-59).

It would have been obvious to one of ordinary skill in the art at the time of invention use a differential amplifying circuit using field-effect transistors as shown by Morita in Miyazaki and Yamagata et al. apparatus as part of D-A converter instead of the output buffers.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki and Yamagata et al. in view of Negishi et al. (US Patent No. 5, 528, 241).



Miyazaki and Yamagata et al. do not show a ladder resistor is configured as one resistor.

Negishi et al. teaches ladder resistor is configured as one resistor (See Fig. 2, item 20, in description See from Col. 2, Line 64 to Col. 3, Line 32 and Abstract).

It would have been obvious to one of ordinary skill in the art at the time of invention use a ladder resistor is configured as one resistor as shown by Negishi et al. in Miyazaki and Yamagata et al. apparatus in order to provide an improved circuit in LCD device.

5. Claims 15-16, 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagata et al. in view of Miyazaki and Kane (US Patent No. 6,229,508 B1).

As to claim 16, Yamagata et al. teaches an image display apparatus driving method for displaying an image (See Fig. 1, item PNL, page 4, paragraph 0059) by writing analog image signal voltages via signal lines into pixel capacitances of individual pixels in a display unit (See Figs. 1, 2, item 4, paragraph 0064), wherein the analog image signal voltages are written into an image display apparatus having a drive unit (See Fig. 1, item PNL, paragraph 0004); including a ladder resistor (See Fig. 2, item 6); gray level voltage selecting means selectively connecting gray level voltage wires to plurality of signal lines (See Fig. 2, item 3, NLN, See page 4, paragraphs 0063-0064), the number of analog gradation voltages being matched with number of gray voltage wires (in reference – 64) gray level voltage wires (See page 4, paragraph 0063), and a

gray level voltage selector connected to the gray level voltage wires (See Fig. 2, item 3, NLN, See page 4, paragraphs 0063-0064).

Yamagata et al. does not show impedance converters each having an input connected to an output of the ladder resistor and gray level voltage wires constituting output lines connected to the impedance converters.

Miyazaki teaches impedance converters connected to an output of a ladder resistor (see Fig. 3, items R1-R5) and gray level voltage wires constituting output lines connected to the impedance converters (See Fig. 3, items A1-A5, V1-V5, from Col. 3, Line 58 to Col. 4, Line 2).

It would have been obvious to one of ordinary skill in the art at the time of invention use impedance converters connected to an output of the ladder and gray level voltage wires constituting output lines connected to the impedance converters as shown by Miyazaki in Yamagata et al. apparatus to reduce the power consumption (See Col. 2, Lines 35-39 in Miyazaki reference).

Miyazaki and Yamagata et al. do not show the analog image signal voltages are written in three separate phases when analog image signal voltages are to be written onto the signal lines.

Kane teaches three separate phases when the analog image signal voltages are to be written onto the signal line (See Figs. 5-6, items 550,530,510, PRECHARGE, AUTOZERO,WRITE DATA, in description See from Col. 5, Line 43 to Col. 6, Line 50).

It would have been obvious to one of ordinary skill in the art at the time of invention to use the driver as shown by Kane in Miyazaki and Yamagata et al. method in order to improve brightness uniformity (See Col. 2, Lines 9-10 in Kane reference).

As to claim 19, Yamagata et al. teaches a driving method for an image display terminal system, display unit comprising: a plurality of display pixels arranged in a matrix form to display an image (See Fig. 1, item PNL, paragraphs 0004, 0059); a group of signal lines provided for each column to transmit analog image signal and connected to the display pixels (See Figs. 1, 2, item 4, paragraph 0064), a drive circuit for driving pixels and the group of signal lines at prescribed timings (See Fig. 1, items 30, page 4, paragraph 0059), means for causing the display pixels to display an image in a prescribed sequence on the basis of inputted image display data (See Fig. 21, SEL1-SEL4, page 1, paragraph 0008), wherein: drive circuit has a ladder resistor and a plurality of gray voltage wires connected to an output of the ladder resistor (See Fig. 2, items 6, NLN); group of signal lines are connected to the gray level voltage wires via a gray level voltage selector (See Figs. 1, 2, items 3, NLN, See page 4, paragraphs 0063-0064), the number of analog gradation voltages being matched with number of gray voltage wires (in reference – 64) gray level voltage wires (See page 4, paragraph 0063), and a gray level voltage selector connected to the gray level voltage wires (See Fig. 2, item 3, NLN, See page 4, paragraphs 0063-0064).

Yamagata et al. does not show impedance converters each having an input connected to an output of the ladder resistor and gray level voltage wires constituting output lines connected to the impedance converters.

Miyazaki teaches impedance converters connected to an output of a ladder resistor (see Fig. 3, items R1-R5) and gray level voltage wires constituting output lines connected to the impedance converters (See Fig. 3, items A1-A5, V1-V5, from Col. 3, Line 58 to Col. 4, Line 2).

It would have been obvious to one of ordinary skill in the art at the time of invention use impedance converters connected to an output of the ladder and gray level voltage wires constituting output lines connected to the impedance converters as shown by Miyazaki in Yamagata et al. apparatus to reduce the power consumption (See Col. 2, Lines 35-39 in Miyazaki reference).

Miyazaki and Yamagata et al. do not show the gray level voltage selector and the gray level voltage wires are provided over a single substrate.

Miyazaki and Yamagata et al. do not show the gray level voltage selector and the gray level voltage wires are provided over a single substrate. It is a common trend to integrate electronic display and controlling circuits on the substrate of the display in order to reduce costs and to improve the driving speed of display. Therefore, the skilled person would also voltage selector and the gray level voltage wires on the substrate of the display as mention in claim 20, without the exercise of inventive skill.

Miyazaki and Yamagata et al. do no show the analog image signal voltages are written in three separate phases when analog image signal voltages are to be written onto the signal lines.

Kane teaches three separate phases when the analog image signal voltages are to be written onto the signal line (See Figs. 5-6, items 550,530,510, PRECHARGE, AUTOZERO,WRITE DATA, in description See from Col. 5, Line 43 to Col. 6, Line 50).

It would have been obvious to one of ordinary skill in the art at the time of invention to use the driver as shown by Kane in Miyazaki and Yamagata et al. method in order to improve brightness uniformity (See Col. 2, Lines 9-10 in Kane reference).

As to claim 15, Miyazaki and Yamagata et al. do not show a luminescent type of display pixels controlled by entered analog image signal and having a light emitting function for displaying an image with luminescence generated by a current flowing between a positive and a negative electrode.

Kane teaches a luminescent type of display pixels controlled by entered analog image signal and having a light emitting function for displaying an image with luminescence generated by a current flowing between a positive and a negative electrode (See Figs. 1-3, item 304, in description See Col. 3, Lines 28-62).

It would have been obvious to one of ordinary skill in the art at the time of invention to use the driver as shown by Kane in Miyazaki and Yamagata et al. apparatus to incorporate a LED (OLED) pixel structure (See Col.2, Lines 9-12 in the Kane reference).

As to claim 18, Kane teaches signal lines are provided with voltage resetting circuits, and analog image signal voltages are written in three separate phases after the voltages of the signal lines are reset in advance by the resetting circuits (See Figs. 5-6,

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items 550,530,510, PRECHARGE, AUTOZERO,WRITE DATA, in description See Col. 6, Lines 15 and 36).

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki, Yamagata et al, Kane as applied to claim 16 above, and further in view of Nakajima et al.

Miyazaki, Yamagata et al. do not show display driving method for displaying an image by writing analog image signal voltages via signal lines into pixel capacitances of individual pixels in a display unit, wherein the analog image signal voltages are written in two separate phases when the analog image signal voltages are to be written onto the signal line.

Nakajima et al. teaches display driving method for displaying an image by writing analog image signal voltages via signal lines into pixel capacitances of individual pixels in a display unit, wherein the analog image signal voltages are written in two separate phases when the analog image signal voltages are to be written onto the signal line (See Figs. 3-4, items 21-26,T1,T2, in description See from Col. 3, Line 45 to Col. 5, Line 7).

It would have been obvious to one of ordinary skill in the art at the time of invention use a first and second phases as shown by Nakajima et al., Miyazaki and Yamagata et al. apparatus in order to provide an improved circuit in LCD device (See Col. 1, Line 66-67 in Nakajima et al. reference).

Nakajima et al, Miyazaki, and Yamagata et al. do not show the third phase.

Kane teaches three separate phases when the analog image signal voltages are to be written onto the signal line (See Figs. 5-6, items 550,530,510, PRECHARGE, AUTOZERO,WRITE DATA, in description See from Col. 5, Line 43 to Col. 6, Line 50).

It would have been obvious to one of ordinary skill in the art at the time of invention to use the driver as shown by Kane in Nakajima et al, Miyazaki and Yamagata et al. apparatus in order to improve brightness uniformity (See Col. 2, Lines 9-10 in Kane reference).

### ***Response to Arguments***

7. Applicant's arguments filed 08/02/06 have been fully considered but they are not persuasive:

On page 11 of Remarks, Applicant's stated that Yamada and Miyazaki fails to disclose, teach or suggest essential claim elements. However, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

On page 12, 2<sup>nd</sup> paragraph of Remarks, Applicant's stated that Miyazaki and the other cited references fail to teach or suggest how to modify Yamagata to obtain the claimed invention. However, "The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of those references would

have suggested to those of ordinary skill in the art.” In *re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). See also In *re Sneed*, 710 F.2d 1544, 1550, 218 USPQ 385, 389 (Fed. Cir. 1983) (“[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review.”); and In *re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973) (“Combining the teachings of references does not involve an ability to combine their specific structures.”).

On page 12, last paragraph and on page 13 of Remarks, Applicant’s stated that there is no motivation to combine the cited references to obtain the invention of claims 1, 16, 19 and 20. However, in response to applicant’s argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, power dissipation can be suppressed by employing higher resistance for the voltage divider and impedance converters (in the reference are equivalent to the voltage followers) (See Col. 1, Lines 41-48 in the Miyazaki reference).

***Telephone inquire***




Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 571-272-7683. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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LS  
10.10.06



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